REMARKS

The claims are amended to more particularly point and distinctly claim the present invention. Support for substantive amendment may be found throughout the specification, but principally at, *e.g.* p. 5, ll. 20-24; p. 6, ll. 13-24; and p. 7, ll. 9-18. Other amendments are generally to provide improved antecedent basis. Upon entry of this amendment, claims 1, 14-17, 22, 23, 25, 26, 29, 30, and 32-40 will be pending. The two sheets of drawings as filed are replaced with two sheets of identical drawings attached herewith, which are submitted to overcome the defects noted.

In the office action mailed November 1, 2002, the Examiner rejected independent claims 1, 14, and 19 (and their dependent claims) contending that the specification does not to provide an enabling description of the claimed invention. The Applicant respectfully traverses these rejections.

Preliminarily, the Applicant notes that enablement of the actual steps of the invention - namely, the steps of creating an adjacency matrix A, computing the matrix products A^TA and AA^T, and determining the eigenvectors of the matrix products - has not been challenged. Indeed, it is submitted that these steps are fully enabled. Instead, the Examiner has contended only that the specification does not adequately described how to select certain parameters for the practice of these steps. In particular it is contended not to describe either (i) "the choice of a value of the integer "n" used to calculate the n-th eigenvector of the matrices that will lead to an accurate result and avoid the problem of diffusion", or (ii) "the calculation of a "connectivity threshold" used to detect an emergent concept".

In response, the Applicant submits that the specification fully enables one of skill in the art to select these and other parameters in order to practice the claims and achieve this invention's objects and benefits of searching out related sites or emergent concepts from a linked collection of sites or concepts. First, the specification and claims provide generally useful parameters values. The independent claims now recite in part "computing one or more non-principal eigenvectors ... wherein each non-principal eigenvector identifies a group of related sites."[1] Clearly, one of ordinary skill in

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[1] The following mathematical facts, well-known to one of ordinary skill, are helpful in appreciating the present invention. In this footnote, the number of rows or columns of the matrix A is taken to be N.

(1) The products A^TA and AA^T are size N, real, symmetric, and positive definite matrices. Thereby, they each have N real eigenvalues and accompanying normalized eigenvectors.

(2) The principal eigenvector is the eigenvector corresponding to the largest eigenvalue. The other N-1 non-principal eigenvectors can be arranged in order of decreasing eigenvalue. For example, the non-principal 50^{th} eigenvector corresponds to the eigenvalue ranked as 50^{th} largest.

(3) All the eigenvalues and eigenvectors of a real, symmetric matrix so arranged are known as a spectral decomposition of the matrix.

(4) The elements of a normalized eigenvector (with norm of 1 as is conventional) are all between -1 and +1.

the art can practice these steps on their face and with great ease by simply selecting any non-principal eigenvector. The specification teaches that such a straightforward selection does in fact achieve objects and benefits of the invention, stating:

> This problem [*i.e.*, diffusion] is remedied by considering non-principal eigenvectors: one considers the full spectral decomposition of A^TA and AA^T, (not only the principal directions). Each non-principal eigenvector gives rises to a community of nodes related by a common concept.[2]

Thus, practice of these steps require no more discretion than the selection of one or more non-principal eigenvectors. Additionally, it is taught here that these steps may be practiced by selection of all the non-principal eigenvectors, the "full spectral decomposition" of the derived matrix products. Either choice will lead to a sought-for group or community of related sites Thereby the claims may be practiced throughout their scope, and perforce they should be considered enabled.

But the specification does not stop here with this basic, generally-useful parameter guidance; it goes on to provide enabling guidance for further more targeted and specific embodiments. For example, users interested in searching for smaller groups or communities of sites are directed particularly to the non-principal eigenvectors corresponding to the smaller eigenvalues (having a larger orders). For example, the specification teaches:

> The topological approach of the present invention achieves remarkable results by considering large order eigenvectors of the matrices A^TA and AA^T. Large order eigenvectors such as the 50^{th} non-principal eigenvector do a beautiful job at isolating smaller communities.[3]

Since the prior art limits its consideration only to the principal eigenvector, this teaching that useful information may be found in higher-order eigenvectors is important and surprising.[4] However, the specification does not teach one larger-order eigenvector selection suitable for all users whatever their interests, and one or average skill in the art would not expect such a single selection. The ordinary skilled person would understand that, because different users may seek groups or communities of different sizes, they may accordingly direct their attention, as guided by the specification, to non-principal eigenvectors of different larger orders.

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2 Specification, p. 6, ll. 16-19.

3 Specification, p. 7, ll. 15-18.

4 Specification, p. 6, ll. 8-12.

Further, for users interested in groups or communities that are more closely related (or less closely related), the specification guides their attention to those sites whose associated eigenvector elements are larger (or smaller). For example, the specification teaches:

> In more practical terms, the set of sites *i* for which is "high" form a community of authority nodes that reinforce the community of hub nodes *j* for which is big.[5]

One of ordinary skill would understand that, because all elements of normalized eigenvectors are between -1 and +1, a few most closely related may be simply selected by picking, for example, those sites with eigenvector element values between 0.9 and 1.0. If these sites suffice for the intended purpose no more need be done, and this invention has achieved its objects. If not, if such sites are not of interest to the user, then equally simply a few less closely related sites may be selected by picking sites with element values between 0.8 and 0.9; and so forth. Therefore, sites of appropriate relatedness may be selected with only a minimum amount of search from the community of sites identified by a particular non-principal eigenvector.

More generally, one of ordinary skill would properly understand the present invention as a search tool for searching through a plurality of linked sites or concepts in order to find groups of related sites or emergent concepts. Although a much improved, more sensitive search tool than previously available tools, such as the standard search engines Yahoo or Alta Vista cited in the specification, the ordinarily-skilled individual would nevertheless expect some degree of trial and error in arriving at satisfactory groups of related sites or emergent concepts.[6] Indeed experience with the previously-available search engines demonstrates that there will be environments and queries requiring a more than usual degree of trial and error. The plurality of sites being searched may simply have no related groups, or emergent concepts of interest, or have such only below a detection threshold.

The present invention enables parameter selection in these more general situations by teaching, for example, as just presented, where to look among the limited number of possible parameters for those appropriate to the different search tasks and environments.[7] In other words, where precise parameters cannot be specified, and would not be expected to be specified, the

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[5] Specification, p. 6, ll. 20-23.

[6] Specification, p. 5, ll. 23-25.

[7] The Applicant notes that the number of eigenvectors equals the number of sites, and that the range of the eigenvector elements is from -1 to +1. Further, the methods of this invention reduce the problem of looking for groups of sites from searching through all 2^N possible groups of sites to examining at most N eigenvectors. For only 200 sites, this is already about an improvement by a factor of about 10^{70}.

specification teaches one of ordinary skill where to look to find those parameters useful to the particular problem at hand.

It should be recalled from the previous that the specification does provide an enabling "backup" choice that will allow practice of the claims in all situations. In such embodiments no or virtually no trial is required or expected. It has already been remarked that any or all non-principal eigenvectors can be used to identify related groups or communities. Similarly, identifying emergent concepts by temporal changes is degree of relatedness, as is recited in claim 14, required virtually no discretion. It is only necessary to look for sites having eigenvector elements with temporally increasing values.

Finally, it is noted that the Examiner has the *prima facie* burden of objectively providing evidence establishing that a specification is non-enabling to one or ordinary skill in the art. In the absence of such evidence or reasons, a specification of appropriate scope must be considered enabling:

> A specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as being in compliance with the enablement requirement of 35 U.S.C. 112, first paragraph, unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support.[8]

It is submitted that the outstanding Office Action has not provided any such objective evidence. Accordingly the truth of the specification, especially as cited above, must be accepted.

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[8] M.P.E.P. § 2164.04 (Rev. 1, Feb 2000).

CONCLUSION

The Applicant respectfully requests entry of the foregoing amendments and remarks into the file of the above-captioned application. The Applicant believes that each ground for rejection or objection has been successfully overcome or obviated and that all the pending claims are in condition for allowance. He earnestly requests reconsideration and withdrawal of the Examiner's objection and rejections and allowance of the application.

If any issues remain, the Examiner is invited to telephone the undersigned to discuss the same and to arrange for prompt and efficient handling of the above-captioned application.

Respectfully submitted,

Date: May 1, 2003 By: _____ 24,615

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